

EXAMPLE 1. HYPOTHETICAL – NEW PC-BOILER (1304 MMBTU/HR)

TOOLS:

Emissions Factors (EF) based on proposed permit limits:

Pollutant	Emissions Factor (lb/MMSCF NG)*
PM	Limited to 0.15 gr/dscf
SO ₂	0.11
NO _x	0.09
VOC	0.0034
CO	0.15
Greenhouse Gases	
CO ₂	213.4 lb/MMBtu
CH ₄	0.04 lb/ton
N ₂ O	0.64 lb/ton

PROBLEM SOLVING:

Question 1: What would the emissions be for the proposed project?

Example Calculation:

PM₁₀ Emissions [tons/yr] =

(90 MMBtu/hr)* (1 MMSCF/1020 MMBtu)* (7.6 lb/MMSCF)*(8760 hr/yr)* 1 ton/2000 lb = **2.93 tons/yr**

CO₂ Emissions [tons/yr] =

(1304 MMBtu/hr) * (213.4 lb/MMBtu) * (8760 hrs/yr) * (0.0005 ton/lb) = 1218838

Calculations

Calculated Total Emissions from the PC-Boiler (Tons/Year):							
PM/PM _{2.5} /PM ₁₀	SO ₂	NO _x	VOC	CO		CO ₂	CH ₄ N ₂ O
139.95	628.40	514.13	19.54	856.908		1218838	13.13 26.26

Question 2: On a mass basis, what are the total emissions of GHGs?

CO₂+CH₄+N₂O = Total Emissions of GHG's (on a mass basis, tpy)

= _____ tpy

Question 3: What are the total emissions of CO_{2e}?

Step 1: Refer to Global Warming Potential (GWP) Table (Title 40, Part 98, Subpart A, Table A-1)

Step 2: Identify pollutants and their respective GWPs.

Pollutant	Global Warming Potential
CO ₂	1
CH ₄	21
N ₂ O	310

$$CO_{2e}(tpy) = \sum (GWP_i \times MassEmissionRate_i(tpy))$$

$$CO_{2e}(tpy) \text{ Example} = (\text{mass } CO_2 * 1) + (\text{mass } CH_4 * 21) + (\text{mass } N_2O * 310) =$$

$$= \underline{\hspace{2cm}} \text{ tons/yr}$$

Calculations [tons/yr] =

Question 4: So, we have

GHGs(mass)	CO _{2e}

APPLICABILITY ANALYSIS:

Question 1: Does this facility require a Title V permit “anyway” (e.g. regulated pollutants ≥ 100 tpy)?

Question 2: Does the permit action have GHG emissions in excess of thresholds?

>100 tpy mass GHG (Title V)	Yes_____	No_____
>100/250 tpy mass GHG (PSD)	Yes_____	No_____
>75,000 CO _{2e}	Yes_____	No_____
>100,000 CO _{2e}	Yes_____	No_____

Question 3: Does the permit action require a PSD “anyway”?

>100 tpy listed major source (ARM 17.8.801)	Yes_____	No_____
>250 tpy non-listed major source	Yes_____	No_____

What are the facility's permit requirements?

If the Permit Decision occurs before 1/2/2011: GHG's do not need to be considered

Step 1: If the permit decision occurs between 1/2/2011 and 7/1/2011:

PSD

Does the facility trigger a PSD action "anyway"?

- If NO, then GHG's do not undergo PSD review.
- If YES, do the GHG emissions exceed thresholds?
 GHG mass \geq 0 tpy _____ Yes/No
 CO₂e \geq 75,000 TPY _____ Yes/No

Yes to both thresholds - then the GHGs must undergo PSD review.

NO to either thresholds - then the GHGs do not undergo PSD review.

Title V

Does the facility need a Title V Operating permit "anyway"?

No - GHG's do not need to be addressed.

Yes - GHG's must be addressed in the Title V Operating permit.

Step 2: If the permit decision occurs after 7/1/2011:

PSD

1. Do any of the criteria pollutants exceed 100 tpy for a listed source or 250 tpy?
 - If Yes, then the facility must undergo PSD review for applicable regulated pollutants, and further analysis would be required to determine if GHGs are subject to PSD (refer to #2).
 -if no, then proceed to question #3
2. Do the GHG emissions trigger PSD?
 a. GHG mass emissions \geq 0 tpy? _____ Yes/No
 b. CO₂e emissions \geq 75,000 TPY CO₂e? _____ Yes/No.
 - If Yes to both 1(a) and (b) - then the GHGs must undergo PSD review.
 - If NO to either 1(a) or (b) - then proceed to #3
3. Do the GHG emissions trigger PSD (continued from #2)?
 a. GHG mass \geq 100(listed)/250 tpy? _____ Yes/No
 b. CO₂e \geq 100,000 TPY CO₂e? _____ Yes/No
 - If Yes to both 2(a) and (b) - then the GHGs trigger PSD review and the facility must undergo PSD review for applicable regulated pollutants.
 - If NO to either 2(a) or (b) - then the GHGs do not trigger PSD review.

Title V

1. Is the facility subject to a Title V based on criteria pollutants "anyway"?

Non-GHG emissions \geq 100 tpy? _____ Yes/No

- If yes, a Title V permit is required for this facility and the application must include GHG applicable requirements.

- If no, proceed to number 2.



2. Is the facility subject to a Title V (continued)?

a. GHG mass emissions ≥ 100 tpy

_____ Yes/No

b. CO₂e emissions $\geq 100,000$ tpy

_____ Yes/No

- If the answer is yes to 2(a) and 2(b), then the facility would need to obtain a Title V Operating Permit. The facility must include GHG applicable requirements.

- If the answer is no to (1) and either 2(a) or 2(b), the facility would not be required to obtain a Title V Operating Permit.